CLAIMS

1. A method of dynamically allocating protection paths in a wavelength-division multiplexed network including a plurality of nodes coupled by communication links, comprising the steps of:

in each node, maintaining a database of information regarding the status of the network including information associating channels in each link of the node to one or more protection paths and information associating channels in each link to respective working paths;

in response to receiving a request for a new protection path to protect a defined working path in one of said nodes:

using the database of said one node to identify links that have at least one shareable channel which may be shared between the new protection path and one or more existing protection paths;

using the database of said one node to identify links that do not have a shareable channel but do have an unused channel that may be used for said new protection path;

assigning costs to identified links; and

determining a protection path using said identified links based on said costs.

2. The method of claim 1 where said step of assigning cost to said identified links comprises the step of assigning weighted costs to said identified links, where links that have at least one shareable channel are weighted differently that links that do not have a shareable channel.

3. The method of claim 2 wherein said cost of a link having at least one shareable channel is based on the length of the link.

4. The method of claim 3 wherein said cost of a link not having at least one shareable channel is based on a multiple of length of the link, such that

links not having at least one shareable channel are disfavored relative to links having at least one shareable channel.

5. The method of claim 1 and further comprising the step of transmitting a setup message to each node on the protection path, wherein the setup message includes a working path identifier.

6. The method of claim 1 wherein said request is received by a source node.

7. The method of claim 1 wherein said database identifies each a status for each channel of each link.

8. The method of claim 7 wherein said database identifies each channel of each link as being either in use, available or shared.

9. The method of claim 1 wherein said step of using the database of said one node to identify links that have at least one shareable channel includes the step of identifying links that are not used by the defined working path.

10. The method of claim 9 wherein said step of using the database of said one node to identify links that have at least one shareable channel further includes the step of identifying links having a channel not used to protect any working paths having common links with the defined working path.

11. A wavelength-division multiplexed network comprising:

a plurality of nodes coupled by communication links, each node comprising router circuitry for:

maintaining a database of information regarding the status of the network including information associating channels in each link of the node to one or more protection paths and information associating channels in each link to respective working paths; and

in response to receiving a request for a new protection path to protect a defined working path in one of said nodes:

using the database of said one node to identify links that have at least one shareable channel which may be shared between the new protection path and one or more existing protection paths;

using the database of said one node to identify links that do not have a shareable channel but do have an unused channel that may be used for said new protection path;

assigning costs to identified links; and

determining a protection path using said identified links based on said costs.

12. The network of claim 11 wherein said router circuitry assigns weighted costs to said identified links, where links that have at least one shareable channel are weighted differently that links that do not have a shareable channel.

13. The network of claim 12 wherein said cost of a link having at least one shareable channel is based on the length of the link.

14. The network of claim 13 wherein said cost of a link not having at least one shareable channel is based on a multiple of length of the link, such that links not having at least one shareable channel are disfavored relative to links having at least one shareable channel.

15. The network of claim 11 wherein said routing circuitry transmits a setup message to each node on the protection path, wherein the setup message includes a working path identifier.

16. The network of claim 11 wherein said database identifies a status for each channel of each link.

17. The network of claim 16 wherein said database identifies each channel of each link as being either in use, available or shared.

18. The network of claim 11 wherein said routing circuitry identifies links that are not used by the defined working path.

19. The network of claim 18 wherein said routing circuitry identifies links having a channel not used to protect any working paths having common links with the defined working path.

20. The network of claim 11 wherein each node further comprises a switching matrix.